were detected not by G-banding but by mRT-PCR in 20 patients and unfavorable aberrations including t(9;22), t(11;19), t(4;11), and t(1;19) were detected by mRT-PCR, not by G-banding, in 14 patients. On the other hand, mRT-PCR could not detect various complexities in 55 patients. Unfavorable aberrations detected by G-banding, not by mRT-PCR, showed relatively poor survival outcomes in chemotherapy group and transplant group ($p = 0.053$ and 0.004, respectively). Favorable aberrations detected by mRT-PCR should be considered as good prognosis even G-banding technique did not detect any aberrations ($p = 0.023$). However, the difference has abolished by autologous or allogeneic hematopoietic stem cell transplantation. mRT-PCR technique can be a complementary diagnostic tool of acute leukemia when combined with conventional cytogenetics and the molecular result is predictable for the prognosis and the resultant survival.

254

A PHASE I STUDY OF GEMTUZUMAB OZOGAMICIN IN COMBINATION WITH A MYELOABLATIVE CONDITIONING (MAC) REGIMEN AND ALLOSCT IN CHILDREN WITH HIGH-RISK CD33+ AML: A NEW TARGETED IMMUNOCHEMOTHERAPY CONDITIONING REGIMEN (GO-BU/CY)

Satwani, P.[1], Dela Cruz, F.[1], Le Gall, J.[1], Jin, Z.[2], Bhatia, M.[1], Garvin, J.H.[1], George, D.[1], Schwartz, J.[3], van de Ven, C.[1], Morris, E.[1], Baxter-Lowe, L.A.[5], Cairo, M.S.[1,3,4] [1] New York Presbyterian Morgan Stanley Children's Hospital, Columbia University, New York, NY; [2] New York Presbyterian Morgan Stanley Children's Hospital, Columbia University, New York, NY; [3] New York Presbyterian Morgan Stanley Children's Hospital, Columbia University, New York, NY; [4] New York Presbyterian Morgan Stanley Children's Hospital, Columbia University, New York, NY; [5] University of California San Francisco, San Francisco, CA

Background: Children with high-risk AML (induction failure [IF], re-induction failure after relapse [RIF], refractory relapse [RR], 3rd complete remission [CR3]) have dismal outcomes (overall survival [OS] 10-20%) (Michallet et al. BMT, 2000; Shenoy et al. BMT 2008). Over 80% of AML patients express CD33. Gemtuzumab Ozogamicin (GO) alone and in combination with chemotherapy is safe and active in childhood AML.

Objectives: To determine the safety, maximum tolerated dose (MTD) and efficacy of GO in combination with busulfan/cyclophosphamide (BU/CY) followed by AlloSCT.

Methods: GO was administered on Day -14 at doses of 3.0, 4.5, 6.0, 7.5 mg/m^2, and BU Days -7, -6, -5, -4 at doses of 12.8-16.0 mg/kg, and CY Days -3, and -2 at doses of 60 mg/kg followed by allogeneic hematopoietic stem cell transplantation (AlloSCT). GVHD prophylaxis consisted of tacrolimus/mycophenolate mofetil.

Results: Twelve patients: 5-IF, 2-RIF, 4-RR,1-CR3; median age: 3yrs (range 1-17) with median follow-up of 1379d (939-2305) in alive patients. Nine UCBT (3 each HLA 6/6-, 5/6-, 4/6-match), 2 MUD (10/10) and 1 MSD. 3 patients each at GO doses of 3.0, 4.5, 6.0, or 7.5 mg/m^2. No dose-limiting toxicities secondary to GO were observed. Day 100 transplant related mortality was 0%. Neutrophil and platelet engraftment was observed in 92% and 75% of patients at median day 22 (12-40) and 42 (21-164), respectively. Median day +30 donor chimerism was 99% (85-100%). The probability of grade II-IV aGVHD was 42% while cGVHD was 28%. Seven of 12 patients relapsed, 5 have died from progressive disease, 6 year event-free survival (EFS) and OS was 33% (CI_{95}10-58%) and 50% (CI_{95}21-73%), respectively.

Conclusion: GO combined with a MAC regimen followed by AlloSCT is well-tolerated in children with high-risk AML and is associated with improved EFS and OS compared to historical controls. The safe and tolerable dose of GO at 7.5mg/m^2 will be studied in a phase II clinical trial under an IND.

255

OUTCOMES OF PATIENTS WITH AML WHO UNDERGO SECOND ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANT OR DONOR LYMPHOCYTE INFUSION

Ku, G.H.[1], Lane, T.A.[3], Castro, J.E.[2], Mulroney, C.M.[2], Ball, E.D.[2], Curtin, P.T.[2] [1] UC San Diego Medical Center, La Jolla, CA; [2] UC San Diego Medical Center, La Jolla, CA; [3] UC San Diego Medical Center, La Jolla, CA

Objective: Second allogeneic hematopoietic stem cell transplants (SCT) and donor lymphocyte infusions (DLI) are used to treat patients who relapse after initial SCT. DLI can also be used to induce graft-versus-host disease (GVHD) or promote donor chimerism. To better understand prognostic factors in this population, we reviewed our institutional experience with second allogeneic SCT/DLI in AML patients.

Methods: We performed a retrospective review of AML patients who received either a second allogeneic SCT or DLI from 1991 through 2009. Progression-free survival (PFS) and overall survival (OS) were estimated by the Kaplan-Meier method, with day of second HSCT/DLI defined as day 0. The COX proportional hazards method was used to determine the individual impact of the following factors at second HSCT/DLI on OS: age, sex, interval from initial transplant, remission status, stem cell graft (CD34+) vs. DLI (CD3+), related vs. unrelated donor, GVHD prophylaxis, and development of acute or chronic GVHD.

Results: 37 AML patients (20 females, 17 males) received a second HSCT or DLI. Median age was 53 years (range 24-69). 17 (46%) patients received stem cells, the rest DLI. Twenty two (50%) had related donors. Median interval from the initial SCT to second SCT/DLI was 99 days (range 21-1227).

Second HSCT/DLI was performed for relapsed/persistent disease (79%), graft failure (11%), and poor chimerism (11%). Prior to second HSCT/DLI, 34% were in complete remission (CR). After second HSCT/ DLI, 66% of 32 evaluable patients were in CR. 14 of 34 evaluable patients (41%) developed acute GVHD, while 3 (9%) developed chronic GVHD. Univariate analysis did not reveal any patient factors that significantly impacted OS. The estimated median PFS and OS were 65 days (95% CI 38-106) and 103 days (95% CI 56-165), respectively.

For patients retransplanted/given DLI for relapsed AML, OS at 100 days, 1 year, and 2 years were 48%, 23%, and 12% respectively. As shown in Table 1, better OS was seen in patients who relapsed > 200 days versus < 100 days after initial SCT. Of 32 deaths, 10 (31%) were treatment related, 21 (66%) were disease related, and 1 (3%) was unknown.

Table 1. Overall survival following second allogeneic SCT/DLI stratified by time of relapse after first SCT.

Time of relapse after first SCT	100 Day	1 Year	2 Year
<100 days	33%	13%	0%
100-200 days	63%	13%	0%
>200 days	88%	50%	25%

Conclusion: A second HSCT or DLI offers a chance at remission for some AML patients who relapse after prior allogeneic SCT. However treatment related mortality is high. Further exploration of additional strategies is needed to optimize outcomes of this group of patients.

256

PHASE I TRIAL OF ESCALATED DOSES OF TARGETED MARROW RADIATION DELIVERED BY TOMOTHERAPY COMBINED WITH ETOPOSIDE AND CYCLOPHOSPHAMIDE; AN ALLOGENEIC HCT PREPARATIVE REGIMEN FOR PATIENTS WITH ADVANCED LEUKEMIA

Stein, A.S., Wong, J., O'Donnell, M.R., Synder, D.S., Palmer, J.M., Tsai, N.-C., Parker, P., Farol, L., Spielberger, R., Sahebi, F., Kogut, N., Forman, S. City of Hope Medical Center, Duarte, CA

Overall survival (OS) for acute leukemia in relapse (RL) or induction failure (IF) treated with HSCT is 16-19% [Duval et al JCO.2010]. While randomized studies have shown a dose response relationship, with higher doses of radiation resulting in decreased relapse, this benefit is offset by increased mortality. We report the initial results of a Phase I trial of 12 patients transplanted between 3/2008 and 7/2010 in which escalated doses of targeted whole body radiation to marrow bearing areas delivered by Tomotherapy on days -10 to -6 was added to etoposide 60mg/kg [adj bw] day -5 and